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# PROTOCHORDATA

INCLUDING

ENTEROPNEUSTA, PTEROBRANCHIA,  
POGONOPHORA AND PHORONIDEA

COMPILED BY

D. B. CARLISLE, M.A., D. Phil.

Evidence has been accumulating in recent years that the Graptolita are closely related to the Pterobranchia and not to the Coelenterata, with which they have been traditionally associated. From 1960, therefore, papers on Graptolita will be recorded in this section. Up to and including 1959 they will be recorded in Section 4 Coelenterata, where they have always been placed.

## I.—TITLES

The year of publication is omitted where it is the same as the volume year of the "Record", namely (1959).

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Beklemishev, K. V. & Burkov, V. A. [The connexion between the distribution of plankton and the distribution of water masses in the zones of convergence in the north western part of the Pacific Ocean.] [Russian.] Trud. Inst. Okeanol. S.S.S.R. 27 1958 : 55-76.

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- Longchamps, M. de S. see Benedin, E. van.
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- Paramonov, A. A.** *see* Abrikosov, G. G.
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**Venkatasubba Rao, S. R.** see Rao, S. R. Venkatasubba.

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**ENTEROPNEUSTA****GENERAL**

Textbooks.—HYMAN (2).

Fauna lists.—Brazil: BJÖRNBERG; Far Eastern Seas of U.S.S.R.: IVANOV (1); Japan: UYINOMI.

Vernacular names.—Japanese: UYINOMI.

Collecting methods.—BENNETT.

Plankton.—BJÖRNBERG.

**STRUCTURE**

Adult.—BJÖRNBERG.

LARVA.—BJÖRNBERG.

**REPRODUCTION**

Breeding Season.—BJÖRNBERG.

**DEVELOPMENT**

Larva.—BJÖRNBERG.

**EVOLUTION**

Phylogeny, systematic position.—BEKLEMISHEV (1); BOETTGER; MARCUS.

**ECOLOGY**

BJÖRNBERG.

Distribution.—BJÖRNBERG.

**DISTRIBUTION**

**NORTH TEMPERATE.**—East Atlantic: larvae and adults: BURDON-JONES; Mediterranean: BJÖRNBERG; Japan: UYINOMI; Far Eastern Seas of U.S.S.R.: IVANOV (10).

**TROPICAL.**—Gulf of Panama: BENNETT; India: BALASUBRAHMANYAN (1).

**PLANCTOSPHEROIDEA**

Textbooks.—HYMAN (2), TOKIOKA (6).

**TUNICATA****GENERAL**

Textbooks.—TOKIOKA (6).

Bibliographies.—Ascidacea: ABBOTT; Thaliacea: BERNER.

Collections.—Ascidacea: MILLAR (1, 2), PÉRES (1, 3), TOKIOKA (2); Thaliacea: from Chile, GUAITA, TOKIOKA (2); Larvacea: from Antarctic, IHLE, TOKIOKA (3).

Fauna lists.—Ascidacea: Alboran Sea, Mediterranean, PÉRES (1), Roscoff, English Channel, RULLIER, Japan, TOKIOKA (6), Japan, UYINOMI; Thaliacea: Chile, GUAITA.

Vernacular names. — Ascidacea: Italian, PARENZAN (2), Japanese, UYINOMI.

Keys.—Thaliacea of Chile: GUAITA.

Food for man.—Ascidacea: PÉRES (2).

Plankton. — JOHNSON, of Caribbean, SUAREZ-CAABRO: Thaliacea: K. V. BEKLEMISHEV & BURKOV, GUAITA; Larvacea: FENAU (1, 2), GRAINGER, MARGINEANU & PETRAN, SANTOS PINTO, TOKIOKA (2), WALDMANN.

Alternation of Generations.—Thaliacea: MASSUTI.

**STRUCTURE**

Nervous system.—Thaliacea: BONE (1).

Biochemistry.—Ascidacea: GOLDBERG.

Cytology, histology.—Ascidacea: of "liver", FOUQUE, RAO (1), MINGANTI (2); Thaliacea: BONE (1).

**PHYSIOLOGY**

Feeding mechanisms, digestion. — Ascidacea: FOUQUE, WERNER.



Heart.—Asciadiacea: KRIJGSMA & KRIJGSMA.

Growth.—Thaliacea: GODEAUX (1).

Biochemistry.—Asciadiacea: DAHLSTED *et al.*, SUZUKI, carotenoids, TSUCHIYA & SUZUKI, glycogen, LENTINI, vanadium, BALTSCHIEFFSKY & MENDIA, vanadium, GOLDBERG.

Pigments.—Asciadiacea: TSUCHIYA & SUZUKI.

### REPRODUCTION

Sexual.—Thaliacea: SUTTON.

Asexual.—Asciadiacea: BREWIN, OKA & WATANABE, SABBADIN (1); Thaliacea: SUTTON.

Andromerogonous hybrids.—Asciadiacea: MINGANTI (1, 2).

Breeding Season.—Asciadiacea: LÜTZEN.

Alternation of generations.—Thaliacea: MASSUTI.

### DEVELOPMENT

Eggs, oogenesis, gonad.—Asciadiacea: RAO (1, 2).

Sperm, spermatogenesis.—Asciadiacea: LENTINI.

Autofertilization.—Asciadiacea: SABBADIN (3).

Cleavage.—Asciadiacea: BENEDIN & LONGCHAMPS.

Embryology.—Asciadiacea: BENEDIN & LONGCHAMPS; experimental, REVERBERI & LA SPINA.

Chemical Embryology.—Asciadiacea: LYNCH (2), PATRICIOLO.

Organogeny.—Asciadiacea: BENEDIN & LONGCHAMPS, SABBADIN (1).

Metamorphosis.—Asciadiacea: LYNCH (1, 2).

Teratology.—Asciadiacea: MINGANTI (2), PATRICIOLO, SCOTT & SCHUH.

### EVOLUTION & GENETICS

Phylogeny, systematic position.—BEKLEMISHEV (1), BOETTGER, MARCUS; Asciadiacea: BREWIN.

Genetics.—Asciadiacea: pigment patterns mendelian, SABBADIN (2).

Chromosome number.—Asciadiacea: MINGANTI (2).

### ECOLOGY & HABITS

Ecology.—Asciadiacea: CASPERS, MARKOWSKI, MILLAR (2), PARENZAN (1, 2); Larvacea: FENAUX (1), MARKOWSKI.

Habitat.—Asciadiacea: BRUN, NAYLOR.

Distribution.—Asciadiacea: LÜTZEN, MILLAR (1, 2).

Annual cycle.—Thaliacea: MASSUTI.

Population studies.—Asciadiacea: PARENZAN (2).

Parasitism.—Asciadiacea: GOTTO, HOPKINS; Thaliacea: HOPKINS.

Nuisance value.—MARKOWSKI.

Fouling.—Asciadiacea: SKERMAN.

Commensalism.—Asciadiacea: DALES, GOTTO.

Symbiosis.—Asciadiacea: GOTTO.

### DISTRIBUTION

ARCTIC.—Asciadiacea: LÜTZEN; Larvacea: GRAINGER.

(1); Mediterranean.—Asciadiacea: PARENZAN (1, 2); PERES (1, 2); Larvacea: FENAUX (1); Black Sea: Asciadiacea: CASPERS; Larvacea: MARGINEANU &

PETRAN; East Pacific: Asciadiacea: MILLAR (1); West Pacific: Asciadiacea: BRUNN, TOKIOKA (2, 4, 5), UTINOMI; Thaliacea: TOKIOKA (2); Larvacea: TOKIOKA (3).

TROPICAL.—Atlantic: Larvacea: SANTOS PINTO, SUAREZ-CAABRO; Indian Ocean, Pacific: Asciadiacea: MILLAR (1).

SOUTH TEMPERATE.—Asciadiacea: BRUNN, MILLAR (1), TOKIOKA (1); Thaliacea: CHILO, GUATTA.

ANTARCTIC.—Larvacea: IHLE.

BATHYMETRIC.—Asciadiacea: LÜTZEN, to 7,000 m depth, MILLAR (1).

## CEPHALOCHORDATA

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Fauna lists.—Malta: LANFRANCO; Japan: UTINOMI.

Vernacular names.—Japanese: UTINOMI.

Plankton.—SUAREZ-CAABRO.

### STRUCTURE

Nervous system.—BONE (2), HOFER.

Histology.—Infundibular organ and Reissner's fibre: HOFER.

### PHYSIOLOGY

Hormones.—SEMBRAT.

### EVOLUTION

Phylogeny, systematic position.—BEKLEMISHEV (1), BOETTGER, BONE (2), MARCUS.

### ECOLOGY AND HABITS

Ecology.—WICKSTEAD & BONE.

NORTH TEMPERATE.—East Atlantic: Asciadiacea: MILLAR (1, 2); Larvacea: Baltic, WALDMANN; West Atlantic: Asciadiacea: MILLAR

### DISTRIBUTION

NORTH TEMPERATE.—Japan: UTINOMI.

TROPICAL.—Indo-Pacific: WICKSTEAD & BONE.

## III.—SYSTEMATIC INDEX

Reference to the "Titles" is by the name(s) of the Author(s).

### POGONOPHORA

#### ATHECANEPHRIA

##### OLIGOBRACHIIDAE

*Birsteinia*, HYMAN (2), IVANOV (5-7), vertical distribution, VINOGRADOVA; *B. vitjasi*, HYMAN (2), IVANOV (5, 6), from Far Eastern U.S.S.R., IVANOV (11), Southward vertical distribution, VINOGRADOVA, ZENKEVICH, from Kuril-Kamohatka Trench, ZENKEVICH *et al.*

*Oligobrachia*, HYMAN (2), IVANOV (2, 5, 6, 7); *O. dogieli* embryology, ALVARADO (2), HYMAN (2), embryology, IVANOV (1), IVANOV (3, 5, 6), Southward *O. ivanovi* sp. nov. Bay of Biscay, Eastern North Atlantic, Southward (1), pp. 439-441 fig. 1.

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*Diplobrachia* nom. nud., *D. belajevi* nom. nud., IVANOV (6).

*Galathealinum*, HYMAN (2), IVANOV (5, 6); *G. brunni*, HYMAN (2), IVANOV (5, 6), from Japan, TOKIOKA (6).

*Heptabrachia*, HYMAN (2), IVANOV (2, 5, 6, 7), vertical distribution, VINOGRADOVA; *H. abyssicola*, IVANOV (5, 6), vertical distribution, VINOGRADOVA, ZENKEVICH, from Japan Trench, ZENKEVICH *et al.*; *H. gracilis*, *H. subtilis*, IVANOV (6).

*Krampolinum*, *K. galathea*, HYMAN (2).

*Polybrachia*, HYMAN (2), IVANOV (3, 5, 6, 7) vertical distribution, VINOGRADOVA; *P. annulata*, IVANOV (3, 5, 6), from Far Eastern U.S.S.R., IVANOV (11), SOUTHWARD vertical distribution, VINOGRADOVA, ZENKEVICH, from Kuril-Kamohatka Trench, ZENKEVICH *et al.*; *P. barbata*, IVANOV (5, 6), from Far Eastern U.S.S.R., IVANOV (11), SOUTHWARD vertical distribution, VINOGRADOVA, ZENKEVICH, from Kuril-Kamchatka Trench, ZENKEVICH *et al.*; *P. capillaris* sp. nov. Bay of Biscay, Eastern North Atlantic, SOUTHWARD pp. 441-444 fig. 2; *P. gorbunovi*, HYMAN (2) (as *Lamellisabella gorbunovi*), IVANOV (5, 6), SOUTHWARD (1), vertical distribution, VINOGRADOVA, ZENKEVICH (as *Lamellisabella gorbunovi*), from Kuril-Kamchatka Trench, ZENKEVICH *et al.* (as *Lamellisabella gorbunovi*).

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## PHORONIDAE

*Actinotrocha*, HYMAN (2); *A. ashworthi*, FORNERIS; *A. bella* nom. nov. FORNERIS, pp. 37-43 figs. 64-89; *A. branchiata*, *A. brounei*, FORNERIS; *A. chata* nom. nov. FORNERIS p. 44 figs. 90-91; *A. dubia*, *A. Gardineri*, *A. gegenbauri*, *A. goodrichi*, *A. haswelli*, *A. hatscheki*? *Phoronis psammophila*, *A. henseni*, *A. hippocrepia*=*Phoronis hippocrepia*, *A. ikedai* *A.=Phoronis ijimai*, *A. ikedai* B, C, D, *A. metschnikoffi*, *A. nenoni*, *A. ornata*, *A. pallida*, *A. sabatieri*, *A. schepotieffii*, *A. seyli*, *A. sheari*, *A. spauldingi*, *A. wilsoni* *A.=Phoronis architecta*, FORNERIS; *A. wilsoni* B. nom. nov., FORNERIS pp. 44-51 figs. 92-118.

*Phoronis*, BEKLEMISHEV (1), HYMAN (2), IVANOV (3); *P. sp.* from Far Eastern U.S.S.R., IVANOV (12); *P. architecta* from India, BALASUBRAHMANYAN (2), FORNERIS, HYMAN (2), from Western North America, MARSDEN; *P. australis* from India, BALASUBRAHMANYAN (2), FORNERIS, HYMAN (2), MARSDEN; *P. buski*, BALASUBRAHMANYAN (2), *P. australis*, HYMAN (2), MARSDEN; *P. capensis*? *P. hippocrepia*, FORNERIS, HYMAN (2), MARSDEN; *P. euzinicola*, HYMAN (2); *P. gracilis*, FORNERIS, =? *P. hippocrepia*, HYMAN (2), =? *P. hippocrepia*, MARSDEN; *P. harmeri* see *Phoronopsis harmeri*; *P. hippocrepia* from Brazil, FORNERIS, HYMAN (2); *P. hippocrepia* complex, MARSDEN; *P. ijimai*, FORNERIS, HYMAN (2), MARSDEN; *P. kovalevskii*=*P. hippocrepia*, HYMAN (2); *P. mulleri*, FORNERIS, HYMAN (2), MARSDEN; *P. ovalis* from Brazil, FORNERIS, HYMAN (2), from Western North America, MARSDEN; *P. pacifica*, HYMAN (2), MARSDEN; *P. pallida* chitin in tube, HYMAN (1), HYMAN (2), from Western North America, MARSDEN; *P. psammophila*, FORNERIS, HYMAN (2), from Western North America, MARSDEN; *P. sabatieri*, FORNERIS, =? *P. psammophila*, HYMAN (2); *P. Vancouverensis*, FORNERIS, HYMAN (2), from Western North America, MARSDEN; *P. viridis* see *Phoronopsis viridis*.

*Phoronopsis*, HYMAN (2); *P. albomaculata*, HYMAN (2), MARSDEN; *P. californica*, MARSDEN; *P. harmeri*, HYMAN (2), includes *P. viridis*, from Western North America, MARSDEN, nerve physiology, WILSON & BULLOCK (as *Phoronis harmeri*); *P. striata*, HYMAN (2), MARSDEN; *P. viridis* chitin in tube, HYMAN (1), HYMAN (2), =? *P. harmeri*, MARSDEN, nerve physiology, WILSON & BULLOCK (as *Phoronis viridis*).

## HEMICHORDATA

## PTEROBRANCHIA

Junior synonym of Graptolithoidea, BEKLEMISHEV (1).

## RHABDOPLEURIDAE

*Hatilophus* prior name for *Rhabdopleura*, *H. mirabilis* = *Rhabdopleura normanni*, HYMAN (2).

*Rhabdopleura*, BEKLEMISHEV (1), HYMAN (2), phylogeny, MARCUS, ROMER; *R. annulata*, *R. mirabilis* = *R. normanni*, *R. normanni*, *R. striata*, HYMAN (2).

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*Cephalodiscus*, BEKLEMISHEV (1), HYMAN (2), phylogeny, MARCUS; *C. australiensis*, *C. densus*, *C. dodecalophus*, *C. fumosus*, *C. gilchristi*, *C. hodgsoni*,

*C. indicus*, *C. inequatus*=*C. hodgsoni*, *C. kempi*, *C. nigrescens*, *C. sibogae*, HYMAN (2).

*Desmiothecia* subgenus of *Cephalodiscus*—q.v., HYMAN (2).

*Idiothecia* subgenus of *Cephalodiscus*—q.v., HYMAN (2).

*Orthoecus* subgenus of *Cephalodiscus*—q.v., HYMAN (2).

#### †EOCEPHALODISCIDAE

†*Eocephalodiscus* phylogeny, MARCUS.

#### ATUBARIIDAE

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### ENTEROPNEUSTA

*Tornaria*, HYMAN (2); *T. biminensis*, *T. cairnsensis*=*Balanoglossus gigas*, *T. chierchiai* I, *T. dubia*=*Glandiceps talaboti*, *T. gigas*, *T. grenacheri*, *T. jamaicensis*, *T. krohni*=*Balanoglossus clavigerus*, *T. lilianae*=*Balanoglossus clavigerus*, from Brazil, *T. morgani*=*Ptychodera flava*, from Brazil, *T. mourei*=*Balanoglossus clavigerus*, from Brazil, *T. mulleri*=*Balanoglossus clavigerus*, from Brazil, *T. nordestina*=*Glossobalanus minutus* or *G. crozieri*, *T. ritteri*=*Balanoglossus gigas*, *T. setoensis*=*Balanoglossus gigas*, *T. snelliusi*, *T. stiasnyi* renamed *T. nordestina*, *T. susakiensis*=*T. chierchiai* I, *T. tergestina*=*Balanoglossus clavigerus*, *T. weldoni*=*Balanoglossus gigas*, BJÖRNBERG.

#### HARRIMANIIDAE

*Dolichoglossus* see *Saccoglossus*.

*Harrimania*, *H. kupferi*, *H. maculosa*, *H. maculosus* (sic), HYMAN (2).

*Protoglossus*, *P. koehleri*, HYMAN (2).

*Saccoglossus*, HYMAN (2), IVANOV (3); *S. apatensis*, *S. cambrensis*, *S. carabiacus*, *S. horsti*, *S. inhacensis*, HYMAN (2); *S. kowalevskii*, HYMAN (2), WEICHERT (as *Dolichoglossus kowalevskii*); *S. madrasensis* and *S. sp. India*, BALASUBRAHMANYAN (1); *S. mereshchikovskii*, HYMAN (2), from far Eastern U.S.S.R., IVANOV (10); *S. ottagonensis*, HYMAN (2); *S. pusillus*, ALVARADO (2) (as *Dolichoglossus pusillus*), HYMAN (2), embryology, IVANOV (1, 4) (as *Dolichoglossus pusillus*), phylogeny, MARCUS; *S. pygmaeus*, *S. ruber*, *S. serpentinus*, *S. sulcatus*, HYMAN (2).

*Stereobalanus*, *S. canadensis*, HYMAN (2).

*Xenopleura*, *X. vivipara*, HYMAN (2).

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*Schizocardium*, BJÖRNBERG, HYMAN (2); *S. brasiliense*, *S. peruvianum*, HYMAN (2).

*Spengelia*, *S. porosa*, *S. sibogae*, HYMAN (2).

*Willezia*, HYMAN (2).

#### PTYCHODERIDAE

*Balanoglossus*, HYMAN (2), IVANOV (3), ROBERTSON, ROMER; *B. apertus*, BJÖRNBERG, HYMAN (2); *B. aurantiacus*, *B. australiensis*, HYMAN (2); *B. biminensis*=*B. gigas*, BJÖRNBERG, HYMAN (2); *B. borealis*, *B. capensis*, HYMAN (2); *B. carnosus*=*B. gigas*, BJÖRNBERG, HYMAN (2); *B. catharinensis*=*from Brazil*, BJÖRNBERG; *B. clavigerus* from Brazil, larvae=*Tornaria krohni*+*T. lilianae*+*T. mourei*+*T. mulleri*+*T. tergestina*, BJÖRNBERG, HYMAN (2); *B. eufrosini* from Brazil, BJÖRNBERG; ? *B. gigas*—from Brazil, larvae=*T. cairnsensis* *Tornaria weldoni*—or *T. setoensis*, BJÖRNBERG, HYMAN (2); *B. g. carnosus* subsp. nov. Pacific, Japan, Australia etc. BJÖRNBERG p. 42; *B. g. gigas* subsp. nov. Atlantic, Brazil, British West Indies, BJÖRNBERG, p. 42; *B. jamaicensis*=*B. gigas*, BJÖRNBERG, HYMAN (2); *B. micakiensis*, HYMAN (2), from Japan, TOKIOKA (6), UTINOMI, *B. natalensis*, HYMAN (2); *B. nonatoi*=*B. clavigerus*, from Brazil, *B. numensis*=*B. gigas*, *B. paranensis*=*B. clavigerus*, from Brazil, *B. paranicola*=*B. clavigerus*, from Brazil, BJÖRNBERG; *B. proterogonius*, HYMAN (2); *B. robinii*, BJÖRNBERG; *B. stephensoni*, HYMAN (2); *B. studiosorum*=? *B. gigas* BJÖRNBERG.

*Glossobalanus*, *G. berkeleyi*, HYMAN (2); *G. crozieri* from Brazil and Bermudas, BJÖRNBERG, HYMAN (2); *G. elongatus*, *G. hedleyi*, *G. marginatus*, HYMAN (2); *G. minutus* from India, BALASUBRAHMANYAN (1); BJÖRNBERG, HYMAN (2); *G. ruficollis*, *G. sarniensis*, HYMAN (2).

*Ptychodera*, HYMAN (2); *P. bahamensis*=*P. flava*, BJÖRNBERG, HYMAN (2); *P. clavigera*=*Balanoglossus clavigerus*, BJÖRNBERG; *P. flava* from India, BALASUBRAHMANYAN (1) includes *P. bahamensis*, BJÖRNBERG, HYMAN (2); *P. gigas*=*Balanoglossus gigas*, BJÖRNBERG.

### PLANTOSPHEROIDEA

#### PLANTOSPHERIDAE

*Plantosphaera*, HYMAN (2); *P. pelagica*, HYMAN (2), from Japan, TOKIOKA (6).

### TUNICATA

#### ASCIDIACEA

#### ENTEROGONA

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*Clavelina*, oogenesis, RAO (2); *C. dellavallei* from Sea of Alboran, PÉRES (1); *C. fasciculata* from Japan, TOKIOKA (6); *C. lepadiformis*, embryology, BENEDIN & LONGCHAMPS, ecology, PARENZAN (2), feeding mechanisms, WERNER; *C. neapolitana* ecology, PARENZAN (2); *C. picta* blood, ANDREWS.

*Colella* see *Sycozoa*; *C. kanzasi*=*Sycozoa kanzasi*, UTINOMI.

*Distaplia clavata* from West Greenland, LÜTZEN; *D. dubia* from Japan, TOKIOKA (6), UTINOMI; *D. galathea* sp. nov. Kermadec Trench, Pacific, MILLAR (1) pp. 190-191 fig. 1; *D. magnilarva* embryology, BENEDIN & LONGCHAMPS, ecology, PARENZAN (2) (as *Haloza magnilarva*—sic), from Alboran Sea, PÉRES (1) (as *Holoza magnilarva*).

*Holoza magnilarva* see *Distaplia magnilarva*.

*Sycozoa kanzasi* from Japan, TOKIOKA (6), UTINOMI; *S. racovitzai* embryology, BENEDIN & LONGCHAMPS (as *Colella racovitzai*).

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*Cyathocormus mirabilis* from Japan, TOKIOKA (6).

*Cystodytes dellechiaiei* ecology, PARENZAN (2), from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3).

*Eudistoma costai* from Alboran Sea, PÉRÈS (1); *E. planum* ecology, PARENZAN (2), from Alboran Sea, PÉRÈS (1); *E. praescleroides* ecology, PARENZAN (1); *E. plumbeum* from Alboran Sea, PÉRÈS (1); *E. rubra* from Japan, TOKIOKA (6).

*Hypsiostoma fassmeriana*, BREWIN, reproduction, SUTTON.

*Paradistoma* see *Polycitor*.

*Polycitor adriaticum* from Alboran Sea, PÉRÈS (1) (as *Paradistoma adriaticum*); *P. crystallinus* ecology, PARENZAN (2) (as *Paradistoma cristallinum*), from Alboran Sea, PÉRÈS (1) (as *Paradistoma cristallinum*); *P. proliferus* from Japan, TOKIOKA (6), UTINOMI; *P. vitreus* from West Greenland, LÜTZEN.

## POLYCLINIDAE

*Amarocicum* invalid mis-spelling for *Amaroucium*—q.v.

*Amaroucium* sp. metamorphosis, LYNCH (1); *A. albicans* from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3); *A. altarium*, TOKIOKA (1); *A. areolatum*, PARENZAN (2) (as *Fragarium areolatum*), from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3); *A. erythraeum* redescribed and figured, *A. flavo-lineatum*, TOKIOKA (1); *A. calciculatum* from Alboran Sea, PÉRÈS (1); *A. conicum* ecology, PARENZAN (2); *A. constellatum* inhibition of metamorphosis, LYNCH (2), chimaeras, SCOTT & SCHUH, TOKIOKA (4); *A. glabrum*, TOKIOKA (4), from Japan, TOKIOKA (6); *A. inversum* sp. nov. Alboran Sea, Mediterranean, PÉRÈS (1) pp. 307–308 fig. 3; *A. lobatum* from Alboran Sea, PÉRÈS (1); *A. lubricum*, TOKIOKA (1); *A. multiplicatum* from Japan, TOKIOKA (6); *A. mutabile* from West Greenland, LUTZEN; *A. nordmanni* from Roscoff, France, RULLIER; *A. phortax* fouling in New Zealand, SKERMAN; *A. pliciferum*, BABA, from Japan, TOKIOKA (6), UTINOMI; *A. proliferum* ecology, PARENZAN (2); *A. simplex*, TOKIOKA (1); *A. soldatovi* from Far Eastern U.S.S.R., USHAKOV (4); *A. solidum*, TOKIOKA (4); *A. takii* sp. nov. Japan, TOKIOKA (4) pp. 237–238 fig. 1 Pl. 19 figs. 3–4; *A. yamazi* from Japan, TOKIOKA (6).

*Aplidiopsis tokaraensis* from Japan, TOKIOKA (6).

*Aplidium caeruleum* var. *argelense* from Alboran Sea, *A. lactum* from Alboran Sea, PÉRÈS (1); *A. (Amaroucium) mutabile* from West Greenland, LUTZEN; *A. petrense*, TOKIOKA (1); *A. (Amaroucium) phortax* fouling in New Zealand, SKERMAN.

*Fragarium* see *Amaroucium*; *F. areolatum* ecology, PARENZAN (2).

*Homoeodistoma longigona* sp. nov. Japan, TOKIOKA (2) pp. 224–225 Pl. 13 figs. 1–5; *H. michaelsoni*, TOKIOKA (2).

*Macrolinum blochmanni* from Alboran Sea, PÉRÈS (1).

*Parascidia* see *Amaroucium*.

*Polyclinella azemai* var. *incolor* from Alboran Sea, PÉRÈS (1).

*Polyclinum aurantium* from Roscoff, France,

RULLIER; *P. constellatum* from Japan, *P. toutsui* from Japan, TOKIOKA (6).

*Psammaphidium pantherinum*, TOKIOKA (1).

*Pseudodistoma antinboja* from Japan, TOKIOKA (6), UTINOMI; *P. arnbäckii* sp. nov. Algeria, PÉRÈS (3) pp. 191–193 fig. 1; *P. cyrenusense* from Alboran Sea, PÉRÈS (1); *P. obscurum* sp. nov. Algeria, PÉRÈS (1) pp. 303–305 figs. 1–2.

*Ritterella pedunculata* from Japan, TOKIOKA (6).

*Sidneoides snamoti* from Japan, TOKIOKA (6).

*Sigillinaria* see *Ritterella*.

*Synicum pulmonaria* from West Greenland, LÜTZEN, from Öresund, MILLAR (2); *S. vabei* sp. nov. West Greenland, LÜTZEN pp. 8–10 fig. 2.

## DIDEMNIDAE

*Didemnum albidum* from West Greenland LÜTZEN, from Japan, TOKIOKA (6); *D. a. polare*, LÜTZEN; *D. candidum* from Japan, TOKIOKA (6); *D. dentatum* from Alboran Sea, *D. fulgens* from Alboran Sea, PÉRÈS (1); *D. fuscum* from Japan, TOKIOKA (6); *D. maculosum* ecology, PARENZAN (2), from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3); *D. m. forma asperum* from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3); *D. misakiense* from Japan, TOKIOKA (6); *D. moseleyi* TOKIOKA (3), from Japan, TOKIOKA (6), UTINOMI.

*Diplosoma gelatinosum* from Roscoff, France, RULLIER, = *D. listerianum*, PÉRÈS (3); *D. listerianum* ecology, NAYLOR, from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3); *D. macdonaldi* fouling in New Zealand, SKERMAN; *D. mitsukurii*, UTINOMI.

*Leptoclinum mitsukurii*, UTINOMI.

*Lissoclinum battailoni* from Alboran Sea, *L. pseudoleptoclinum* from Alboran Sea, PÉRÈS (1).

*Polysyncrator lacazei* from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3).

*Trididemnum allenii* from Alboran Sea, PÉRÈS (1); *T. graphicum* from Provence, PÉRÈS (2); *T. tenerum* from West Greenland LÜTZEN, from Alboran Sea, PÉRÈS (1), from Algeria, PÉRÈS (3), from Roscoff, France, RULLIER.

## DIAZONIDAE

*Diazona violacea*, PARENZAN, from Alboran Sea, PÉRÈS (1) from Algeria, PÉRÈS (3).

*Rhopalaea macrothorax* from Japan, TOKIOKA (6); *R. neapolitana* ecology, PARENZAN (2), from Alboran Sea PÉRÈS (1).

*Rhopalopsis hartmeyerii* from Alboran Sea, PÉRÈS (1).

*Syndiazona grandis*, TOKIOKA (2, 4, 6), UTINOMI.

## CIONIDAE

*Ciona* ecology, MARKOWSKI, commensalism, DALES; *C. intestinalis* embryology, BENEDIN & LONGCHAMPS, from Black Sea, CASPERS, biochemistry, DAHLSTED et al., biochemistry, vanadium, GOLDBERG, heart-beat and drugs, KRIJGSMA & KRIJGSMA, biochemistry of glycogen in sperm, LENTINI, from Öresund, MILLAR (2), ecology, NAYLOR, ecology, PARENZAN (1), teratology, PATRICIOLO, embryology,

REVERBERI & LA SPINA, endocrinology, SEMBRAT, TOKIOKA (2), from Japan, TOKIOKA (6), UTINOMI; *C. i. longissima* from West Greenland, LÜTZEN.

## PEROPHORIDAE

*Ecteinascidia thurstoni* eggs, RAO (1), development of gonads, oogenesis, RAO (2); *E. tokaraensis* from Japan, TOKIOKA (6); *E. turbinata* blood, ANDREW, LÜTZEN, oogenesis, RAO (2).

*Perophora formosana* from Japan, TOKIOKA (6).

## CORELLIDAE

*Abyssascidia wyvillei* from Kermadec Trench, MILLAR (1).

*Chelyosoma orientale* from Far Eastern U.S.S.R., USHAKOV (4).

*Corella oogenesis*, RAO (2); *C. eumoyta* fouling in New Zealand, SKERMAN; *C. japonica* from Japan, TOKIOKA (6), UTINOMI; *C. parallelogramma* from Öresund, MILLAR (1).

*Megalodicopia hians* from Japan, TOKIOKA (6).

*Rhodossoma turcicum* from Japan, TOKIOKA (6); *R. verecundum* from Alboran Sea, PÉRES (1).

## ASCIDIIDAE

*Ascidia ahodori* from Japan, *A. armata* from Japan, TOKIOKA (6); *A. aspersa* ecology, PARENZAN (1), from Alboran Sea, PÉRES (1); *A. callosa* from West Greenland, LÜTZEN; *A. ceratodes* vanadium, GOLDBERG; *A. conchilega* from Öresund, MILLAR (2), from Alboran Sea, PÉRES (1); *A. corellodes* var. *mediterranea* var. nov. Alboran Sea, PÉRES (1) pp. 309-310 fig. 4; *A. djimphiana*, LÜTZEN; *A. involuta* ecology, PARENZAN (2); *A. longistriata* from Japan, TOKIOKA (6); *A. malaca* andromerogonous hybrids with *Phallusia mammillata*, MINGANTI (1, 2), embryology, REVERBERI & LA SPINA; *A. mentula* GOTTO, ecology, PARENZAN (2), from Alboran Sea, PÉRES (1), from Algeria, PÉRES (3); *A. m. forma rubra* ecology, *A. m. forma typica* ecology, PARENZAN (2); *A. nigra* blood, ANDREW; *A. obliqua* from West Greenland, *A. prunum* from West Greenland, LÜTZEN; *A. sydneiensis*, TOKIOKA (2); *A. s. samea* from Japan, TOKIOKA (6); *A. zara*, TOKIOKA (2), from Japan, TOKIOKA (6), UTINOMI.

*Ascidella aspersa* embryology, BENEDIN & LONGCHAMPS, from Black Sea, CASPERS, ecology, PARENZAN (2); *A. a. forma cristata* ecology, *A. a. forma scabra* ecology, PARENZAN (2); *A. pellucida* from Alboran Sea, PÉRES (1), from Algeria, PÉRES (3); *A. scabra* from Öresund, MILLAR (2), ecology, NAYLOR.

*Phallusia fumigata* ecology, PARENZAN (2); *P. mammillata* andromerogonous hybrids with *Ascidia malaca*, MINGANTI (1, 2), ecology, PARENZAN (1, 2), from Alboran Sea, PÉRES (1).

## AGNESTIDAE

*Agnesia himeboja* from Japan, TOKIOKA (6).

## OCTACNEMIDAE

*Octacnemus*, IVANOV (7); *O. bythius* from Kermadec Trench, MILLAR (1), from Japan, TOKIOKA (6); *O. herdmanni* from Japan, TOKIOKA (6).

## PLEUROGONA

## BOTRYLLIDAE

*Botrylloides*, BABA; *B. aurantium* = *B. violaceum*, UTINOMI; *B. aureum* from West Greenland LÜTZEN; *B. leachi* ecology, NAYLOR, ecology, PARENZAN (2),

from Roscoff, France, RULLIER, fouling in New Zealand, SKERMAN; *B. violaceum* budding, OKA & WATANABE, TOKIOKA (2), from Japan, TOKIOKA (6), UTINOMI.

*Botryllus*, BABA, WEICHERT; *B. magnicoecus* from Japan, TOKIOKA (6); *B. primigenus*, OKA & WATANABE, autofertilization, SABBADIN (3), from Japan, TOKIOKA (6); *B. schlosseri* from Black Sea, CASPERS, LÜTZEN, ecology, NAYLOR, ecology, PARENZAN (1), ecology, PARENZAN (2) (as *Polycyclus renieri*), from Alboran Sea, PÉRES (1), from Roscoff, France, RULLIER, regeneration, SABBADIN (1), Mendelian genetics of pigmentation, SABBADIN (2), autofertilization, SABBADIN (3), fouling in New Zealand, SKERMAN, from Japan, TOKIOKA (6), UTINOMI; *B. tuberosus* from Japan, TOKIOKA (6).

*Chorizocarpa dofeini* from Japan, *C. macleayanus* from Japan, *C. siboga* from Japan, TOKIOKA (6).

*Distomus variolosus*, LÜTZEN, ecology, PARENZAN (2).

*Eusynstyela monotestis* from Japan, TOKIOKA (6).

*Kukenthalia borealis* from West Greenland, LÜTZEN.

*Metrocarpa leachi* from Alboran Sea, PÉRES (1); *M. nigrum* ecology, PARENZAN (2).

*Polyandrocarpa (Eusynstyela) monotestis* from Japan TOKIOKA (6).

*Polycyclus* see *Botryllus*; *P. renieri* see *Botryllus schlosseri*.

*Polyzoa vesiculiphora* from Japan, TOKIOKA (6).

*Stolonica canadensis*, HYMAN (2); *S. socialis*, LÜTZEN.

*Symplegma reptans*, TOKIOKA (2), from Japan, TOKIOKA (6), UTINOMI.

*Synstyela* see *Symplegma*; *S. reptans* = *Symplegma reptans*, UTINOMI.

## STYELIDAE

*Alloecarpa incrustans* embryology, BENEDIN & LONGCHAMPS.

*Asterocarpa cerea* fouling in New Zealand, SKERMAN.

*Bathystyeloides enderbyanus* from abyss of Tropical Atlantic, Indian Ocean and Tasman Sea, MILLAR (1).

*Botryorchis clava* = *Styela clava*, TOKIOKA (5).

*Cnemidocarpa areolata*, TOKIOKA (2), from Japan, TOKIOKA (6); *C. bythia* from abyss of Tasman Sea and Kermadec Trench, MILLAR (1); *C. cirrata*, LÜTZEN; *C. fertilis* redescribed and figured, TOKIOKA (2), from Japan, TOKIOKA (6); *C. finmarkiensis* from West Greenland, LÜTZEN; *C. macrogaster*, TOKIOKA (2), from Japan, TOKIOKA (6); *C. miyadi* from Japan, TOKIOKA (6); *C. mollespina* from Öresund, MILLAR (2); *C. platybranchia* = *Styela sericata*, MILLAR (1); *C. rhizopus*, LÜTZEN.

*Dendrodoa adolphii* = *D. pulchella*, LÜTZEN; *D. aggregata* from West Greenland, breeding season, LÜTZEN, from Japan, TOKIOKA (6); *D. carnea*, LÜTZEN, *D. grossularia*, embryology, BENEDIN & LONGCHAMPS (as *Stylopsis grossularia*), LÜTZEN, from Öresund, MILLAR (2); *D. kukenthalii*, *D. pulchella*, LÜTZEN.

*Dicarpa simplex* from Kermadec Trench, MILLAR (1).



*Pandocia* see *Polycarpa*.

*Pelonaisia corrugata* from West Greenland, LÜTZEN, from Öresund, MILLAR (2), from Far Eastern U.S.S.R., USHAKOV (4).

*Polycarpa albatrossi* from abyss of Seychelles and Sunda Trench, MILLAR (1); *P. cryptocarpa*, TOKIOKA (2); *P. c. kuroboja* from Japan, TOKIOKA (6), UTINOMI; *P. fibrosa* from West Greenland, LÜTZEN, from Öresund, MILLAR (2), from Alboran Sea, PÉRES (1); *P. gracilis* from Alboran Sea, PÉRES (1); *P. granosa* redescribed and figured, *P. maculata*, redescribed and figured, TOKIOKA (2); *P. pomaria* ecology, PARENZAN (2), from Alboran Sea, PÉRES (1), from Algeria, PÉRES (3); *P. p. var. tuberosa* ecology, PARENZAN (2) (as *Pandocia pomaria* var. *tuberosa*); *P. psammotesta* from Japan, TOKIOKA (6).

*Styela oogenesis* RAO (2); *S. atlantica*, LÜTZEN, from Japan, TOKIOKA (6); *S. clava*, BABA, TOKIOKA (2, 5, 6), UTINOMI; *S. c. var. symmetrica* var. nov. Japan, TOKIOKA (5) pp. 460-461 fig. 1; *S. coriacea* from West Greenland, LÜTZEN, from Öresund, MILLAR (2); *S. ether* from Japan, TOKIOKA (2, 6); *S. gelatinosa* from West Greenland, LÜTZEN; *S. isuwana* from Japan, TOKIOKA (6); *S. kuroboja* = *Polycarpa cryptocarpa* var. *kuroboja*, UTINOMI; *S. longipedata* from Japan, TOKIOKA (5, 6); *S. mammiculata*, TOKIOKA (5); *S. milleri*, LÜTZEN, from abyss of Indian Ocean, MILLAR (1); *S. montereyensis* biochemistry, GOLDBERG; *S. partita* ecology, PARENZAN (2) (also as *Tethyum partitum*), from Alboran Sea, PÉRES (1), from Japan, TOKIOKA (6); *S. plicata*, BABA, ecology, PARENZAN (2), fouling in New Zealand, SKERMAN, from Japan, TOKIOKA (6), UTINOMI; *S. rustica* from West Greenland, LÜTZEN; *S. sericata* from abyss of Indian Ocean, Seychelles, Tasman Sea and Kermadec Trench, MILLAR (1).

*Stylopsis* see *Dendrodoa*.

*Tethyum* see *Styela* and *Halocynthia* (Pyuridae); *T. partitum* see *Styela partita*.

## PYURIDAE

*Boltenia echinata* from West Greenland, LÜTZEN, from Öresund, MILLAR (2), from Japan, TOKIOKA (2, 6), from Far Eastern U.S.S.R., USHAKOV (4); *B. isibayi* from Japan, TOKIOKA (6); *T. ovifera* from West Greenland, LÜTZEN, from Far Eastern U.S.S.R., USHAKOV (4).

*Culcolus herdmanni* from Japan, TOKIOKA (6); *C. suhmi* from abyss of Indian Ocean and Tasman Sea, diagnosis, MILLAR (1).

*Cynthia* see *Halocynthia*; *C. ritteri* + *C. ovestoni* + *C. igabaja* = *Halocynthia hilgendorfi*, *C. karasboja* = *Halocynthia vittata*, *C. roretzi* = *Halocynthia roretzi*, *C. superba* = *Halocynthia aurantium*, UTINOMI.

*Halocynthia aurantium*, LÜTZEN, from Japan, TOKIOKA (6), from Far Eastern U.S.S.R., USHAKOV (4) (as *Tethyum aurantium*), UTINOMI; *H. cactus* from Japan, TOKIOKA (2, 6); *H. hilgendorfi* from Japan, TOKIOKA (2, 6), UTINOMI; *H. igabaja*, *H. pachyderma*, TOKIOKA (2); *H. papillosa* histology, FOUQUE, HOLTER, PARENZAN (1), ecology, PARENZAN (2) (as *Cynthia papillosa*); *H. pyriformis* from West Greenland, LÜTZEN; *H. ritteri*, TOKIOKA (2); *H. roretzi* biochemistry SUZUKI (as *Cynthia roretzi*), from Japan, TOKIOKA (6), biochemistry of carotenoids,

TSUCHIYA & SUZUKI (as *Cynthia roretzi*), from Far Eastern U.S.S.R., Ushakov (4) (as *Tethyum roretzi*), UTINOMI.

*Herdmania momus* from Japan, TOKIOKA (2, 6), UTINOMI.

*Microcosmus claudicans* histology, FOUQUE, ecology, PARENZAN (2); *M. curvus* from Japan, TOKIOKA (6); *M. glacialis* from West Greenland, LÜTZEN; *M. Hartmeyer* from Japan, TOKIOKA (2, 6); *M. kura* fouling in New Zealand, SKERMAN; *M. multitentaculatus* redescribed and figured, TOKIOKA (2); *M. nacreus* = *M. glacialis*, LÜTZEN; *M. polymorphus* ecology, PARENZAN (2); *M. sulcatus* histology, FOUQUE, ecology, PARENZAN (1, 2), from Alboran Sea, PÉRES (1), from Algeria, PÉRES (3); *M. vulgaris* ecology, PARENZAN (1, 2).

*Pyura* sp. eggs, RAO (1); *P. lepidoderma* from Japan, TOKIOKA (2, 6), UTINOMI; *P. michaeleni* from Japan, TOKIOKA (6), UTINOMI; *P. microcosmus* histology, FOUQUE, from Alboran Sea, PÉRES (1), from Algeria, PÉRES (3); *P. mirabilis* from Japan, TOKIOKA (6), UTINOMI; *P. ovifera*, LÜTZEN; *P. saciformis* from Japan, TOKIOKA (6); *P. savignyi* ecology, PARENZAN (1); *P. squamulosa* histology, FOUQUE, ecology, PARENZAN (2), from Alboran Sea, PÉRES (1); *P. vittata* histology, FOUQUE, first record from Mediterranean, coast of Provence, PÉRES (2), from Japan, TOKIOKA (6), UTINOMI.

*Tethyum* see *Halocynthia* and *Styela* (Styelidae); *T. aurantium* see *Halocynthia aurantium*; *T. roretzi* see *Halocynthia roretzi*.

## MOLGULIDAE

*Oaesira* see *Molgula*.

*Oeniceella appendiculata* histology, FOUQUE, from Alboran Sea, PÉRES (1); *O. undulata* from Japan, TOKIOKA (6).

*Eugyra adriatica* from Black Sea, CASTERS; *E. arenosa* histology, FOUQUE; *E. glutinans*, LÜTZEN, from Japan, TOKIOKA (6); *E. hexarhiza* from Japan, *E. japonicus* from Japan, TOKIOKA (6).

*Eugyroides glutinans*, UTINOMI.

*Hartmeyeria orientalis* from Japan, TOKIOKA (6).

*Lithonephrya eugyrida* embryology, BENEDIN & LONGHAMPS.

*Molgula* sp. parasitized, HOPKINS; *M. aidae* from Japan, TOKIOKA (6); *M. bacca*, LÜTZEN; *M. citrina* from Roscoff, France, RULLIER; *M. crystallina* = *M. griffithsi*, USHAKOV (4); *M. galathea* sp. nov. abyssal tropical Atlantic, MILLAR (1) pp. 202-203 fig. 13; *M. globularis*, LÜTZEN; *M. griffithsi* from West Greenland, LÜTZEN, from Far Eastern U.S.S.R., USHAKOV (4); *M. immunda* abyssal from Macassar Strait, MILLAR (1); *M. i. forma monocarpa* form. nov. Kermadec Deep, MILLAR (1) pp. 201-202 fig. 12; *M. impura* ecology, PARENZAN (1, 2) (as *Caesira impura*); *M. interrupti* from Japan, TOKIOKA (6); *M. manhattensis* histology, FOUQUE, ecology, NAYLOR, WEICHERT; *M. oculata* histology, FOUQUE, ecology, PARENZAN (2) (as *Caesira oculata*); *M. redikorzevi* from Japan, TOKIOKA (6); *M. siphonalis* from West Greenland, LÜTZEN.

## HEXACROBYLIDAE

*Hexacrobylus*, IVANOV (7); *H. indicus* from Seychelles, abyssal, MILLAR (1).



## THALIAACEA

## PYROSOMATIDA

## PYROSOMATIDAE

*Pyrosoma*, K. V. BEKLEMISHEV & BURKOV; *P. atlanticum* near bottom in deep water, HURLEY & MCKNIGHT, from Japan, TOKIOKA (2, 6); *P. operculatum*, TOKIOKA (2); *P. spinosum* from Japan, TOKIOKA (2, 6).

## DOLIOLIDA

## DOLIOLIDAE

*Doliolum*, WEICHERT; *D. denticulatum* stolon formation, GODEAUX, from Spain, Mediterranean, MASSUTI, from Japan, TOKIOKA (6); *D. mülleri* nervous system, BONE (1), from Japan, TOKIOKA (6); *D. nationalis* from Japan, TOKIOKA (6).

## SALPIDA

## SALPIDAE

*Cyclosalpa bakeri* from Japan, TOKIOKA (6); *C. pinnata* from Chile, GUAITA, from Japan, TOKIOKA (6).

*Isas zonaria* from Chile, GUAITA, from Japan, TOKIOKA (6).

*Ihlea magalanhica* from Chile, GUAITA.

*Metcalfina hexagona* from Japan, TOKIOKA (6).

*Pegea confederata* from Chile, GUAITA, from Spain, Mediterranean, MASSUTI, from Caribbean, SUAREZ-CAABRO (as *Salpa* (*Pegea*) *confederata*), from Japan, TOKIOKA (6).

*Ritteriella amboinensis* from Japan, TOKIOKA (6); *R. picteti* from Chile, GUAITA.

*Salpa*, WEICHERT; *S. africana-maxima* nervous system, BONE (1); *S. confederata* see *Pegea confederata*; *S. cylindrica* see *Weelia cylindrica*; *S. fusiformis* from Chile, GUAITA, from Spain, Mediterranean, MASSUTI, reproduction, SUTTON, from Japan, TOKIOKA (6); *S. maxima* nervous system, BONE (1), from Chile, GUAITA, from Spain, Mediterranean, MASSUTI, reproduction, SUTTON; *S. pinnata* reproduction, SUTTON; *S. racovitzai*=*Ihlea magalanhica*, GUAITA.

*Thalia democratica* nervous system, BONE (1), from Chile, GUAITA, Spain, Mediterranean, MASSUTI, from Caribbean, SUAREZ-CAABRO, from Japan, TOKIOKA (6).

*Thetys vagina* from Japan, TOKIOKA (6).

*Weelia cylindrica* from Chile, GUAITA, from Japan, TOKIOKA (6) (as *Salpa cylindrica*).

## LARVACEA

## OIKOPLEURIDAE

*Althoffia tumida*, TOKIOKA (3).

*Coccaria* subgenus of *Oikopleura*—q.v.

*Haplopleura papillosa* from Alboran Sea, PÉRÈS (1).

*Megalocercus abyssorum* senior synonym of *M. atlanticus*, *M. atlanticus*=*M. abyssorum*, FENAUX (2); *M. huzleyi*, FENAUX (2), from Japan, TOKIOKA (3, 6).

*Oikopleura* phylogeny, MARCUS; *O. sp.* from Caribbean, SUAREZ-CAABRO; *O. albicans*, FENAUX (1), from Japan, TOKIOKA (6); *O. cophocerca*, FENAUX (1), from Japan, TOKIOKA (3, 6); *O. dioica*, FENAUX (1),

ecology, MARKOWSKI, from Black Sea, MÄRGINEANU & PETRAN, from Portuguese Guiana, SANTOS PINTO, from Japan, TOKIOKA (6), from Baltic, WALDMANN; *O. fusiformis*, FENAUX (1), from Portuguese Guiana, SANTOS PINTO, from Japan, TOKIOKA (3, 6); *O. f. forma cornutopaster* from Japan, TOKIOKA (6); *O. intermedia*, FENAUX (1), from Japan, TOKIOKA (3, 6); *O. labradoriensis* from East Greenland, GRAINGER, from Japan, TOKIOKA (6); *O. longicauda*, FENAUX (1), from Caribbean, SUAREZ-CAABRO, from Japan, TOKIOKA (3, 6); *O. parva* from Japan, TOKIOKA (3, 6); *O. rufescens*, FENAUX (1), from Japan, TOKIOKA (3, 6); *O. valdiviae* from Antarctic, IHLE; *O. vanhoeffeni* from Canadian Arctic, GRAINGER.

*Pelagopleura*, TOKIOKA (3); *P. verticalis* from Japan, TOKIOKA (6).

*Stegosoma magnum* from Japan, TOKIOKA (3, 6).

*Vezillaria* subgenus of *Oikopleura*—q.v.

## FRITILLARIIDAE

*Acrocercus* subgenus of *Fritillaria*—q.v.

*Appendicularia sicula*, FENAUX (1), from Japan, TOKIOKA (6).

*Eurycercus* subgenus of *Fritillaria*—q.v.

*Fritillaria antarctica*, IHLE; *F. borealis*, FENAUX (1), from Canadian Arctic, GRAINGER, from Antarctic, IHLE, from Japan, TOKIOKA (3, 6); from Baltic, WALDMANN; *F. b. forma sargassi* from Japan, TOKIOKA (6); *F. formica*, FENAUX, from Japan, TOKIOKA (3, 6); *F. fraudax*, FENAUX (1), from Japan, TOKIOKA (3, 6); *F. haplostoma*, FENAUX (1), from Portuguese Guiana, SANTOS PINTO, from Japan, TOKIOKA (3, 6); *F. megachile*, FENAUX (1), from Japan, TOKIOKA (3, 6); *F. pellucida*, FENAUX (1), from Japan, TOKIOKA (3, 6); *F. tenella*, FENAUX (1); *F. venusta* from Portuguese Guiana, SANTOS PINTO, from Japan, TOKIOKA (3, 6).

*Tectillaria fertilis* from Japan, TOKIOKA (6).

## KOWALEVSKAIIDAE

*Kowalevskia tenuis*, FENAUX (1), from Japan, TOKIOKA (3, 6).

## CEPHALOCHORDATA

## BRANCHIOSTOMATIDAE

*Amphioxides pelagicus* central nervous system, BONE (2), =? larva of *Asymmetron lucayanum*, ecology, WICKSTEAD & BONE.

*Amphioxus*, IVANOV (4), ROMER, ROBERTSON, larva in Caribbean, SUAREZ-CAABRO.

*Asymmetron lucayanum*, ecology, larva=? *Amphioxides pelagicus*, WICKSTEAD & BONE.

*Branchiostoma* phylogeny, MARCUS, WEICHERT, endocrinology, SEMBRAT; *B. belcheri* central nervous system, BONE (2), from Japan, TOKIOKA (6), UTINOMI, larval ecology, WICKSTEAD & BONE; *B. lanceolatum* central nervous system, BONE (2), infundibular organ and Reissner's fibre, HOFER, from Malta, LANFRANCO, larval ecology, WICKSTEAD & BONE; *B. malayana* central nervous system, BONE (2), larval ecology, WICKSTEAD & BONE; *B. nigeriense* central nervous system, BONE (2), larval ecology, WICKSTEAD & BONE; *B. takoradii* central nervous system, BONE (2).

*Paramphioxus bassanus* central nervous system, BONE (2).

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